

REMARKS

The Office Action mailed October 1, 2002, has been reviewed and the comments of the Patent and Trademark Office have been considered. By this amendment, claim 5 has been canceled without prejudice or disclaimer, and claims 1, 6 and 20 have been amended. No new matter has been added. Claims 1-4 and 6-20 are pending for consideration.

Allowable subject matter

Applicants appreciate the indication that claim 6 includes allowable subject matter. Applicants have not amended claim 6 to be in independent form at this time, because for the reasons given below, applicant believe that claim 1, from which claim 6 depends, is allowable.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 2 and 5 stand rejected under 35 U.S.C. 112, second paragraph. Specifically the Office Action stated:

Claims 2,5 are recites [sic] the limitation "the fixing portions" There is insufficient antecedent basis for this limitation in the claim.

The rejection is moot with respect to claim 5, which has been canceled. The limitations of claim 5 have been included in amended claims 1 and 20. Applicants submit that there is sufficient antecedent basis for the limitation "the fixing portions" in claims 1 and 20. The rejection with respect to claim 2 is not understood, because claim 2 does not include the limitation "the fixing portions". Applicants submit that the rejection under 35 U.S.C. 112, second paragraph has been overcome without any narrowing amendments.

Rejection under 35 U.S.C. § 102

Claims 1-5 and 7-20 stand rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,370,026 to Sunaga et al. (hereafter "Sunaga"). Applicants respectfully traverse this rejection for the following reasons.

Claims 1 and 20 have been amended to more clearly define the present invention of these claims by including the limitations of original claim 5, which has been canceled.

Claims 1 and 20, as amended, both recite a pressing member that comprises “a pair of fixing portions which are formed at free end portions of the positioning portions, and the fixing portions are hung with a lower surface of the electric circuit board. In addition to reciting the position of the fixing portions relative to the electric circuit board, claims 1 and 20 also recite a position of the legs of a heat sink relative to the electric circuit board. Specifically, claim 1 recites “a heat sink comprising . . . a pair of supporting legs extending from opposite end portions of the heat radiating portion, the heat sink being disposed on the electric circuit board by contacting an end portion of each of the supporting legs with the electric circuit board.” Similarly, claim 20 recites “a heat sink comprising . . . a pair of supporting legs extending from opposite sides of the heat radiating portion, a free end portion of each supporting leg being in contact with the electric circuit board.” Thus, in the invention as recited in claims 1 and 20, the ends of the supporting legs are in contact the electric circuit board (such that they contact the upper surface of the electric circuit board), while the fixing portions are hung with a lower surface of the electric circuit board.

The relative arrangement of the fixing portions, heat sink supporting legs and electric circuit board of claims 1 and 20 provides exemplary advantages in a given embodiment of the claimed invention. With this arrangement, the circuit board is sandwiched between fixing portions and the end portions of the supporting legs of the heat sink. Accordingly, when the circuit board is soldered at its lower surface, the supporting legs are shielded by the circuit board preventing unnecessary solder from attaching to the supporting legs (see present specification page 18, line 17 to page 19, line 19). Thus, the brushless motor of claim 1 (or the assembly structure of claim 20) avoids the need to perform complicated processes such as removing unnecessary solder, and prevents erroneous operation of circuitry associated with the circuit board due to errant solder (see present specification page 19, lines 19-25). Furthermore, the brushless motor of claim 1 (or the assembly structure of claim 20) prevents the potential problem that the lower end portions of the supporting legs of the heat sink will contact the solder in a soldering bath, causing the temperature of the heat sink to rise to such an contact as to degrade the heat radiating performance thereof (page 19, lines 26-33).

Sunaga fails to teach the arrangement of the fixing portions, heat sink supporting legs and electric circuit board as recited claims 1 and 20 or suggest the attendant advantages of this structure. Sunaga discloses a structure with a circuit board 35 attached to both inner and lower portions of supporting legs of a heat sink 5 (see FIG 1). Thus, Sunaga discloses that the supporting legs project from a lower surface of the circuit board 35. That is, the ends of the supporting legs themselves are not in contact with the circuit board. This means excess solder can attach to the supporting legs, which is undesirable. Thus, Sunaga fails to teach the structure recited in claims 1 or 20, or the attendant advantages of this structure discussed above.

Furthermore, applicants believe that Sunaga is not prior art to the present application. Sunaga was filed on January 5, 2001, after the foreign priority date of the present application of December 18, 2000. Should the Examiner maintain the rejection under 35 U.S.C. 102(e) based on Sunaga, applicants reserve the right to file a certified translation of the foreign priority application to overcome the rejection.

Moreover, applicants believe that Sunaga is at least not prior art for the purposes of 35 U.S.C. 103, because the present application and Sunaga are both assigned to the same assignee, Calsonic Kansei Corporation.

For at least the reasons given above, applicants submit that claims 1 and 20 are patentable over Sunaga. The dependent claims 2-4 and 6-19, are patentable for at least the same reasons as claim 1, and for further patentable features recited therein. Accordingly, applicants respectfully request that the rejection of the claims under 35 U.S.C. 102 be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, applicants respectfully submit that all of the pending claims are now in condition for allowance. An early notice to this

effect is earnestly solicited. If there are any questions regarding the application, the Examiner is invited to contact the undersigned at the number below.

Respectfully submitted,

Date March 27, 2003

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Should additional fees be necessary in connection with the filing of this paper, or if a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge Deposit Account No. 19-0741 for any such fees; and applicant(s) hereby petition for any needed extension of time.



Versions with Markings to Show Changes Made

In the Claims:

1. (Amended) A brushless motor comprising:

a stator comprising a plurality of exciting coils;

a rotor rotatable relative to the stator;

an electric circuit board comprising a control circuit for controlling rotation of the rotor, the electric circuit board having through-holes;

a heat sink comprising a heat radiating portion and a pair of supporting legs extending from opposite end portions of the heat radiating portion, the heat sink being disposed on the electric circuit board by contacting an end portion of each of the supporting legs with the electric circuit board;

a plurality of switching devices electrically connected with the electric circuit board, the switching devices controlling a direction of drive current supplied to exciting coils of the stator; and

a pressing member comprising a pressing portion, a pair of positioning portions extending respectively from opposite end portions of the pressing portion, and a pair of connecting portions projecting respectively from the pair of positioning portions respectively, the pressing portion pressing the switching devices to the heat sink by engaging the connecting portions with the heat sink, the positioning portions being inserted into the through-holes of the electric circuit board respectively,

wherein the pressing member further comprises a pair of fixing portions which are formed at free end portions of the positioning portions, and the fixing portions are hung with a lower surface of the electric circuit board.

6. (Amended) The brushless motor as claimed in claim [5] 1, wherein the fixing portion is formed by forming an inversed U-shaped slit on the positioning portion and bending a portion defined by the inversed U-shaped portion outwardly.

20. (Amended) An assembly structure of a brushless motor, comprising:

a circuit board comprising a control circuit for controlling a rotation of a rotor relative to a stator of the brushless motor and through-holes;

a heat sink comprising a heat radiating portion and a pair of supporting legs extending from opposite sides of the heat radiating portion, a free end portion of each supporting leg being in contact with the electric circuit board;

a plurality of switching devices electrically connected with the electric circuit board, the switching devices controlling a direction of drive current supplied to exciting coils of the stator; and

a pressing member comprising a pressing portion, a pair of positioning portions perpendicularly extending from opposite end portions of the pressing portion, and a pair of connecting portions projecting from the pair of positioning portions respectively, the connecting portions being engaged with the supporting legs respectively, the pressing portion pressing the switching devices to the heat sink, the positioning portions being inserted into the through-holes of the electric circuit board respectively,

wherein the pressing member further comprises a pair of fixing portions which are formed at free end portions of the positioning portions, and the fixing portions are hung with a lower surface of the electric circuit board.